



**Technical Memorandum**  
**Comments on the Draft Nature and Extent Data Report**

**Gulco Marine Maintenance Company**  
**Freeport, Brazoria County, Texas**  
**EPA Identification No. TXD055144539**

**Remedial Action Contract 2 Full Service**  
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*Prepared for*

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## **1.0 INTRODUCTION**

This Technical Memorandum summarizes EA Engineering, Science, and Technology, Inc.'s (EA's) technical review comments for the Draft Nature and Extent Data Report (NEDR) prepared by Pastor, Behling & Wheeler, LLC (PBW) for the Gulfco Marine Maintenance Superfund Site (site), located in Freeport, Texas, which was submitted to the U.S. Environmental Protection Agency (EPA) on 2 March 2009. A review of this Draft NEDR also required the review of PBW's Remedial Investigation (RI) and Feasibility Study Work Plan (PBW 2005a) and associated Sampling and Analysis Plan (SAP) (PBW 2005b), the Unilateral Administrative Order (UAO) (EPA 2005), and monthly status reports that have been submitted to the EPA by PBW since January 2008. In addition, a number of interim deliverables regarding ongoing sediment, soil, and ground water investigations (including results) were also reviewed. A complete list of documents reviewed in this analysis has been included as references to this Technical Memorandum.

General technical review comments pertaining to the Draft NEDR (PBW 2009) are provided in Section 2.0. Specific technical review comments associated with the body of the Draft NEDR, including the tables and figures, are provided in Section 3.0.

## **2.0 GENERAL TECHNICAL REVIEW COMMENTS**

### **General Comment 1. Purpose**

We recognize that the Draft NEDR is the precursor to the RI Report. Nonetheless, we believe that it would be helpful if the sampling strategy took into consideration likely remedial alternatives to be employed.

### **General Comment 2. Nature and Extent of Soils Contamination**

It is difficult to directly correlate sample locations with their intended purpose when cross-referencing the Draft NEDR with the Work Plan. A total of 13 potential source areas (PSAs) were identified in the Work Plan (PBW 2005a) and SAP (PBW 2005b) as requiring investigation, with tables prepared by PBW that identified the number of samples necessary to evaluate each source. A figure showing the PSAs should have been included in the NEDR.

A review of the number of samples collected by source area does not correlate with the proposed numbers. In part it appears that many of samples collected are being applied to different areas and are in fact double, if not triple-counted. For example, a sample collected in the sand blasting area is also applied to the sample count for the dry dock and Lot 21 areas. Furthermore, soils in the immediate vicinity of former tanks and pipelines should be analyzed for potential impacts.

**General Comment 3. Incomplete Delineation of the North Area**

To a large degree, the level of effort expended on delineating the extent of contamination was focused on justification of incomplete characterization. For the North Area the following statement was made:

“Since the lateral extent of soils in the North Area is bounded by the surrounding wetland areas, the lateral extent of soil contamination in this area has been effectively...determined.”

**General Comment 4. Soil Sampling Strategy**

We recognize that the overall sampling strategy is based on random grid locations. However, given the number of likely point sources and release locations within each of the PSAs, we believe that some additional biased sampling is also warranted to truly assess risk. With regard to the use of the grid strategy, we think that at a minimum, the grids in the northern portion of the site should be of the same size as the southern grids (i.e. 100-foot spacings maximum as opposed to the 200-foot grid used in the north).

**General Comment 5. Sampling Strategy**

In general, the overall soil sampling strategy needs to take into account the most likely remedial alternatives to be employed. For example, if a removal action is anticipated, the additional samples should be located around ‘hotspots’ to bracket the volume of contaminated soils. These samples may be analyzed using either screening methods, where appropriate, or sent to a fixed laboratory.

**General Comment 6. Sediments versus Soils**

The difference between wetland sediment and soil is not clearly defined in the Work Plan, SAP, or NEDR. In fact, the two are described as having “similar composition and condition”. This is important given the conclusion that the lateral extent of soil contamination in the North Area terminates at the contact with the wetland sediment. As with the soils, neither the vertical nor the lateral extent of contamination was adequately delineated. Sediments were sampled to a maximum depth of 2 feet, only if ground water was not present. Regardless of whether ground water is present, sediment samples at greater depths are necessary to establish the sediment to ground water pathway.

**General Comment 7. Direction of Ground Water Flow**

As detailed in the NDER (PBW 2009), the site is underlain by three water-bearing zones that have been evaluated with respect to potential impacts. They are: Zone A from 5 to 15 feet below ground surface (bgs), with an average thickness of 8 feet; the Zone B encountered at an average depth of 20 feet bgs, with an average thickness of 20 feet, and Zone C, a thin shell hash unit encountered at a depth of approximately 73 feet bgs. All three of these water-bearing zones are under confined conditions, with ground water elevations in the Zone A

being approximately 0.5- 1.5 feet mean sea level (msl), Zone B having an elevation of approximately 1.5- 2.5 feet msl, and Zone C having an approximate elevation of -1.0 to -6 feet msl. Based on this data, it appears that hydraulic gradients are up from Zone B to Zone A, and down from Zone B to Zone C. Because of the distribution of wells, it is not possible to draw this conclusion regarding vertical gradients in other portions of the site. Potentiometric maps for Zones A, B, and C were reviewed. The direction of ground water flow in Zone A is highly variable, with the direction of ground water flow in the northern portion of the site ranging from northwest to almost due west. In the southern portion of the site the direction of ground water flow remains primarily to the south. A review of draft cross sections prepared by PBW highlight some of the problems with determining the direction of ground water flow at the site. We believe that the direction of ground water flow is heavily influenced by tidal fluctuations. As stated in a previous Technical Memorandum on EA's Comments on the Ground Water Letter Proposal (EA 2007), we believe that the direction of ground water flow can be better reconciled with more intense monitoring of water levels, and possibly including the deployment of data loggers within select wells at the site.

Because of the fluctuations in the direction of ground water flow, wells assessing water quality down-gradient of impacted areas must be located over large areas. A prime example of this is water quality in the vicinity of ND3MW29, where direction of ground water flow changes as much as 90 degrees. Not only is the location of the one verification sampling point at ND3PZ04 insufficient to delineate the lateral extent of contamination, this piezometer is not down gradient of well ND3MW29.

#### **General Comment 8. Presence of Dense Non-aqueous Phase Liquid**

Section 2.6 of the Draft NDER described a methodology whereby the presence of a dense non-aqueous phase liquid (DNAPL) was based on the visual observations and/or measurements made with an interface probe. Using these criteria, the presence of DNAPL in water at the site was discounted. We disagree with this conclusion. In guidance pertaining to the technical impracticability of ground water restoration (EPA 1993), dissolved phase concentrations in excess of 10 percent of a compound's solubility was indirect evidence that a residual phase DNAPL was present. This rule of thumb has been used throughout the United States. At the Gulfco site, two compounds were detected at concentrations that exceed this criterion. In well ND3MW29, the maximum 1,1,1-trichloroethane (1,1,1-TCA) was 234 milligrams per liter (mg/L); the solubility of 1,1,1-TCA is 657 mg/L. In this same well, trichloroethylene (TCE) was detected at a concentration of 135 mg/L; the solubility of TCE is 1,312 mg/L. Given 1,1,1-TCA being detected at 36 percent of its solubility and TCE at 10 percent of its solubility, it is highly likely that residual phase DNAPL is present at this location. Because of this, additional vertical delineation is necessary.

**General Comment 9. Delineation of the Extent of Contamination**

We do not agree with the conclusion that the extent of ground water contamination has been delineated in either Zone A, B, or C. Given the contaminant distribution at the site, we believe that additional monitoring wells are necessary to determine the extent of ground water contamination in both the shallow and intermediate zones.

**General Comment 10. Screening Values**

Several screening values are presented in the Draft NEDR including the Texas Commission on Environmental Quality benchmarks and the EPA Region 6 screening criteria. Preliminary Screening Values (PSVs) are also presented; however their derivation is not explained in the document. The prevalence of the PSVs and their use in the determination of the conclusions of this document warrant providing the methodology behind their derivation.

Also, the EPA Region 6 screening criteria for soil have been replaced by the EPA Regional Screening Levels (RSLs). RSLs should also be provided as a relevant screening tool. Further, although there are no RSLs for sediment or surface water, it is typical to use adjusted soil and tap water (respectively) RSLs as surrogates for these media. This allows a comparison to a health-based screening value.

**General Comment 11. Number of Samples per Medium**

The document does not sufficiently detail the number of samples taken per area (e.g. Ground water Zone A) to provide the reader with an adequate understanding of the relative number of samples per area. In addition, some areas do not appear to have a sufficient number of sample coverage. For example, ground water Zone C has only one well. Further, the ground water sample discussions do not discuss seasonality. The document should detail the number of samples taken per area, the analyses conducted for each sample (e.g., metals only or metals and semi-volatile organic compounds), and the ground water sections should address seasonality and its effect on the characterization of each ground water zone.

**General Comment 12. Sediment and Soil Sample Designation**

The document discusses sediments and soil as two different media. It appears that all of the samples designated as sediment were collected offsite in the Intracoastal Waterway. However, there is no discussion regarding the classification of a sample as soil versus sediment onsite. It is unclear how sediments onsite are characterized. The percent moisture in the soil versus sediment samples should be discussed.

### **3.0 SPECIFIC TECHNICAL REVIEW COMMENTS**

The following technical review comments (Specific Comments 1 through 12) are associated with the body of the Draft NDER, including the tables and figures.

**1. Figures 17-19, Zone A Potentiometric Surface**

Although several wells are identified as not being used in the ground water contouring (MW-1, MW-2, MW-3, HMW-1, HMW-2, HMW-3, and SA4MW22), it appears that these wells are in fact being used to generate contours.

**2. Figure 21, Zone A Potentiometric Surface December 3, 2007**

As contoured, the 1.5 feet msl contour in the southern portion of the site is extended across the Intracoastal Waterway. By definition, this is in fact sea level. As such, the contouring should be revised.

**3. Figures 23 through 32**

The contaminant plumes, as drawn, do not appear to take into account the changing directions of ground water flow in Zone A.

**4. Section 2.1.2, page 10, first paragraph**

PSVs are discussed, but their derivation is not explained in the document. It is unclear if they are health-based in nature. Although this information is referenced as in the Work Plan, it should also be presented in this document.

**5. Section 2.3.1, page 11, first paragraph**

Sediment samples were collected adjacent to the site. It is not clear how sediment onsite is characterized. Please provide a discussion about the potential for onsite sediments and their characterization.

**6. Section 2.4.1, page 14, first paragraph**

Soil samples were only taken to a depth of 5 feet. Please indicate why soils were only sampled to this depth interval.

**7. Section 2.4.2, page 18, first paragraph**

Soil samples were only taken to a depth of 1 foot and were only analyzed for lead. It is indicated that this is based on information provided in the Work Plan and in a letter to EPA. This information should be provided in this document, either in the text or in an appendix providing the letter to EPA.

**8. Section 2.7, page 33, Groundwater**

The conclusion regarding the extent of site ground water containing chemicals of interest at concentrations exceeding evaluation criteria is misleading. The extent of contamination in Zone B is not fully delineated. Additional wells in Zone B should be completed to the west of well ND3MW29, where 1,1,1-TCA and TCE concentrations are suggestive that residual DNAPL is present.

**9. Table 4**

This table should also provide the RSLs for soil.

**10. Tables 2, 4, 6, 8, and 14**

These tables should include a footnote that explains the methodology behind the selection of the extent evaluation comparison values.

**11. Appendix B**

The background concentration tolerance limit calculations were based on analyses performed by ProUCL. However, these model outputs were not provided. Please include the goodness of fit tests and ProUCL outputs.

**12. Appendix B**

Please add the sample sizes to the summary tables reporting the upper tolerance limits.

## REFERENCES

- EA Engineering, Science, and Technology, Inc. (EA). 2007. Technical Memorandum, Comments on the Ground Water Letter Proposal (19 January 2007). Gulfco Marine Maintenance Superfund Site, Freeport, Brazoria County, Texas. February.
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- PBW. 2006a. Draft Cross-Section Figures, Gulfco Marine Maintenance, Freeport, Brazoria County, Texas. November.
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- PBW. 2007b. Letter from Eric F. Pastor, PBW, to M. Gary Miller, U.S. Environmental Protection Agency (EPA), Region 6, regarding Proposed Background Soil Sampling Program, Gulfco Marine Maintenance Site, Freeport, Texas. 2 February.
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- PBW. 2007d. Letter from Eric F. Pastor, PBW, to M. Gary Miller, EPA, Region 6, regarding, Phase 1 Soil Investigation Data and Proposed Phase 2 Soil Investigation Activities, Gulfco Marine Maintenance Site, Freeport, Texas. 11 September.
- PBW. 2008a. Letter from Eric F. Pastor, PBW, to M. Gary Miller, EPA, Region 6, regarding, Proposed Phase 4 Groundwater Investigation Activities, Gulfco Marine Maintenance Site, Freeport, Texas. 11 February.
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PBW. 2009. Draft Nature and Extent Data Report for Gulfco Marine Maintenance Superfund Site, Freeport, Texas. 2 March.

U.S. Environmental Protection Agency (EPA). 1993. Guidance for Evaluating the Technical Impracticability of Ground-Water Restoration. Office of Solid Waste and Emergency Response. Directive 9234.2-25. September.

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EPA. 2007. Letter from Gary Miller, EPA, to Eric F. Pastor, PBW, regarding, Unilateral Administrative Order, CERCLA Docket No. 06-05-05 Groundwater Data and Proposed Monitoring Wells, Gulfco Marine Maintenance Site, Freeport, Texas. 28 February.

EPA. 2008. "EPA Regional Screening Levels." September. On-line address:  
[http://www.epa.gov/reg3hwmd/risk/human/rb-concentration\\_table/Generic\\_Tables/index.htm](http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/index.htm)

EPA. 2008. Letter from Gary Miller, EPA, to Eric F. Pastor, PBW, regarding Unilateral Administrative Order, CERCLA Docket No. 06-05-05, Phase 3 Wetland Surface Sediment Investigation Data and Proposed Phase 4 Wetland Sediment Investigations Activities, Gulfco Marine Maintenance, Superfund Site, Freeport, Texas. 12 February.